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> The function of education is to teach one to think intensively and to think critically Intelligence plus character—that is the goal of true education

CSIR NET - GENERAL APTITUDE

QUANTITATIVE APTITUDE

L-5

PERCENTAGE

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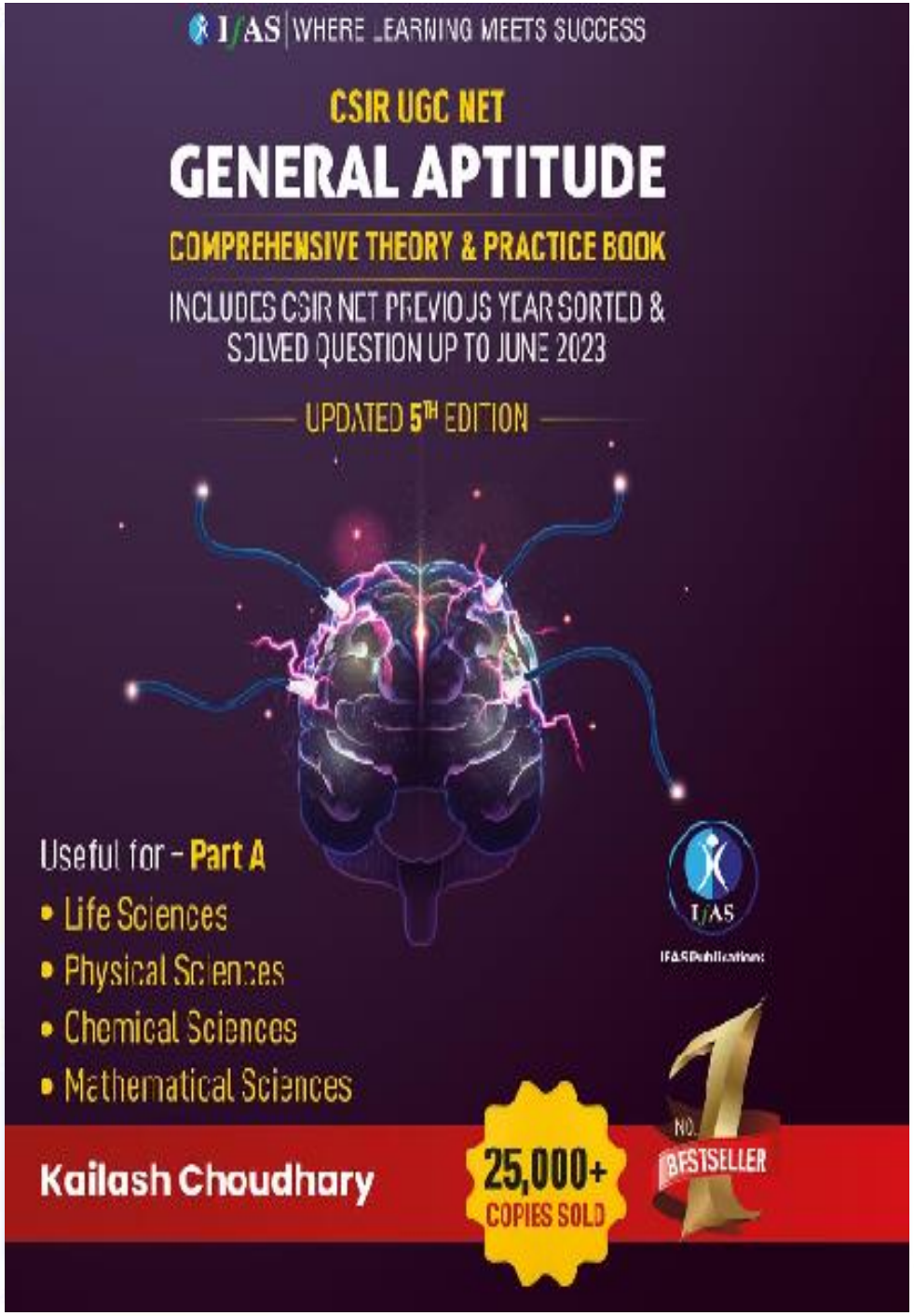
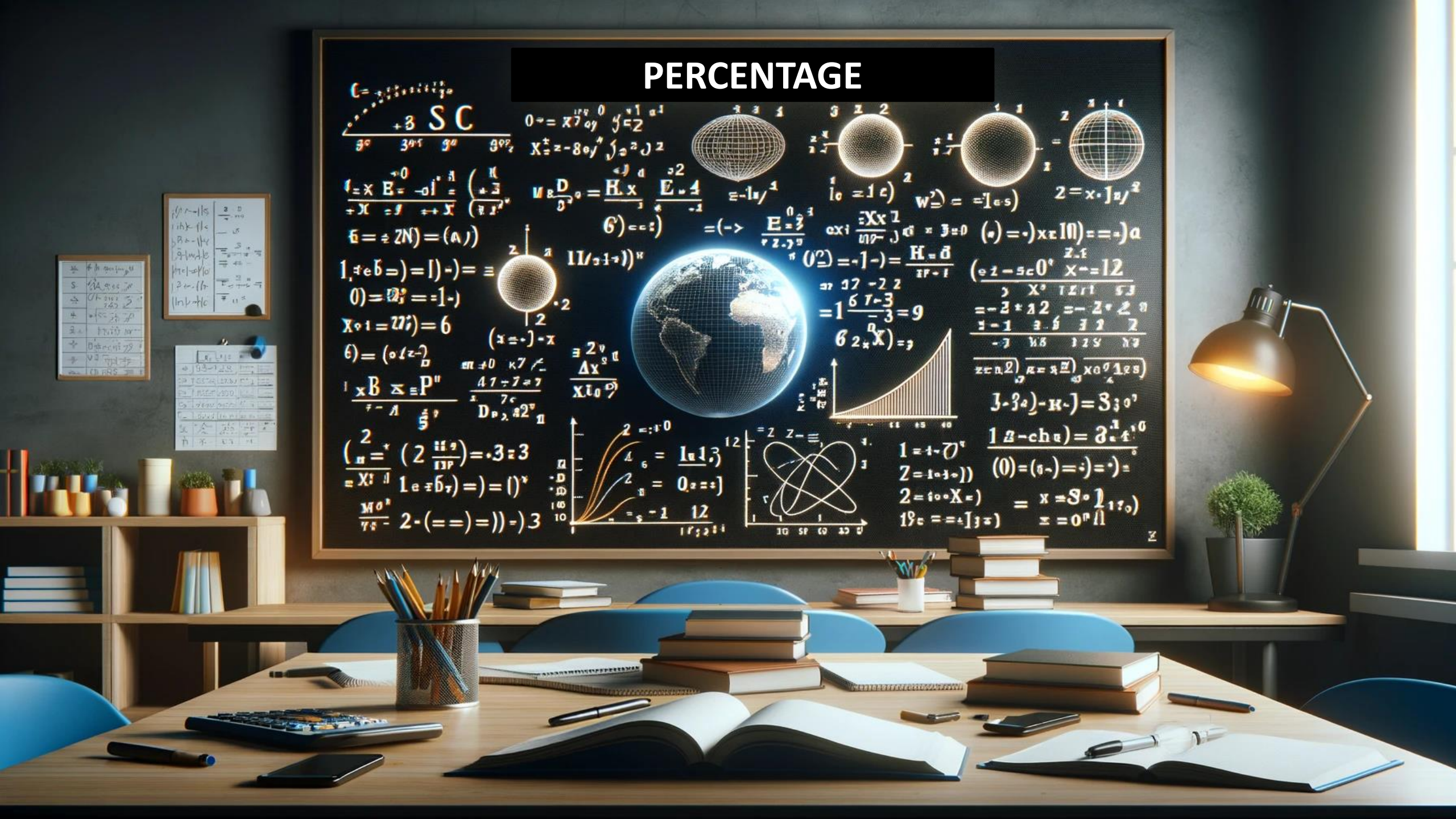


Topic Covered in Today's Session

1. What is Percentage ?
2. What is profit and loss?
3. What is successive discount ?
4. Practice questions

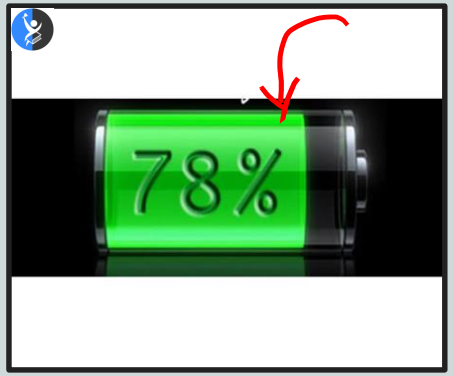

PERCENTAGE

What is Percentage ?

The term 'percent' is derived from the Latin word 'Per centum'. It implies "out of every hundred".

400/500

80/100



Percentage to fraction chart

Percentage	Fraction
100%	1
50%	$\frac{1}{2}$
$33\frac{1}{3}\%$	$\frac{1}{3}$
25%	$\frac{1}{4}$
20%	$\frac{1}{5}$
$16\frac{2}{3}\%$	$\frac{1}{6}$
$14\frac{2}{7}\%$	$\frac{1}{7}$
$12\frac{1}{2}\%$	$\frac{1}{8}$
$11\frac{1}{9}\%$	$\frac{1}{9}$
10%	$\frac{1}{10}$
$9\frac{1}{11}\%$	$\frac{1}{11}$
$8\frac{1}{3}\%$	$\frac{1}{12}$
$7\frac{9}{13}\%$	$\frac{1}{13}$
$7\frac{1}{7}\%$	$\frac{1}{14}$
$6\frac{2}{3}\%$	$\frac{1}{15}$
$6\frac{1}{4}\%$	$\frac{1}{16}$
5%	$\frac{1}{20}$
$4\frac{1}{6}\%$	$\frac{1}{24}$
4%	$\frac{1}{25}$
$3\frac{1}{3}\%$	$\frac{1}{30}$
$2\frac{1}{2}\%$	$\frac{1}{40}$
2%	$\frac{1}{50}$
1%	$\frac{1}{100}$

$33\frac{1}{3}\%$ of 96

$100\% = 1$

$50\% = \frac{1}{2}$

$25\% = \frac{1}{4}$

$12\frac{1}{2}$ OR $12.5\% = \frac{1}{8}$

$16\frac{2}{3}\%$ of 96 = ?

$\frac{1}{6} \times 96 = 16$

$11\frac{1}{9}\%$ of $81 = \frac{1}{9} \times 81 = 9$

$11\frac{1}{9}\% = \frac{100}{9}\% = \frac{100}{9 \times 100} = \frac{1}{9}$

$16\frac{2}{3}\% = \frac{50}{3}\% = \frac{50}{3 \times 100} = \frac{1}{6}$

$16\frac{2}{3}\%$ OR 16.666% OR 16.67%

$33\frac{1}{3}\%$ OR 33.333%

Q1. If 33.33% ($\rightarrow \frac{1}{3}$) of a number is added to 16, then the result is the number itself. Find the number

1) 30
2) 33
3) 36
4) 24 ✓

Let No be x ✓

$$\frac{x}{3} + 16 = x$$

$$16 = x - \frac{x}{3}$$

$$16 = \frac{3x - x}{3}$$

$$48 = 2x$$

$$24 = x$$

Alt

$\frac{N}{D} = \frac{1x}{3x}$ ← 33.33 %
3x ← [original Number]

$$1x + 16 = 3x$$

$$16 = 2x$$

$$x = 8$$

$$3x = 3 \times 8 = 24$$

25% → 100

1x ← original No.
4x

$$1x + 100 = 4x$$

$$x = \frac{100}{3}$$

$$4 \times \frac{100}{3} = ?$$

$$\text{Percentage increase} = \frac{\text{increase in the quantity}}{\text{original quantity}} \times 100$$

$$\text{Percentage decrease} = \frac{\text{decrease in the quantity}}{\text{original quantity}} \times 100$$

(#)

A	B
50	200

B is what percentage of A? (Num. / Deno.)

$$\frac{B}{A} \times 100 = \frac{200}{50} \times 100$$

400%

A	B
50	200

$$\% \text{ increase} = \frac{(200-50)}{50} \times 100 = \frac{150}{50} \times 100 = 300\%$$

C	D
200	50

$$\% \text{ decrease} = \frac{(200-50)}{200} \times 100 = \frac{150}{200} \times 100 = 75\%$$

Eg. What percent of a day is 3 hours?

(1) $12\frac{1}{2}\%$ ✓

(2) $16\frac{1}{3}\%$

(3) $18\frac{2}{3}\%$

(4) $22\frac{1}{2}\%$

$$\% = \frac{3}{24} \times 100^{25} = \frac{25}{2} = 12\frac{1}{2}\%$$

Marks

200 → 50% ↑ → 200 + 100 = 300

200 → 100% → 50% ↑ → $200 \times \frac{150}{100} = 300$

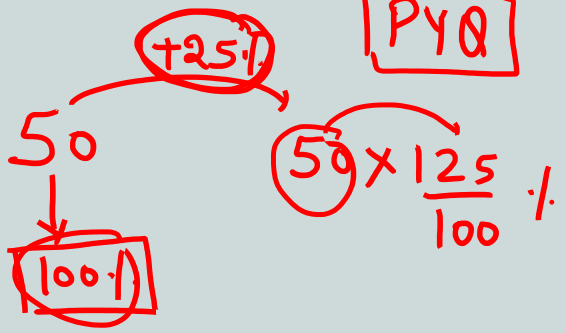
$300 \times \frac{150}{100} = 450$

$200 \times \frac{150}{100} \times \frac{150}{100} = 450$

Q3. The rabbit population in community A increases by 25 % per year while in community B increases at 50 % per year respectively. If the present populations of A and B are equal, the ratio of the number of rabbits in B to A after two years will be?

PYQ

(1) 1.44 (2) 1.72
(3) 1.90 (4) 1.25



Sol. $\frac{B}{A} = \frac{100 \times \frac{150}{100}\ (1st) \times \frac{150}{100}\ (2nd)}{100 \times \frac{125}{100} \times \frac{125}{100}} = \frac{150 \times 150}{125 \times 125}$ (6 / 5)

$\frac{B}{A} = \frac{36}{25} = 1.44$

Q4. The sum of square of two positive numbers is 628 and one number is 45 5/11 % less than other number. Find the smaller number.

45 5/11 %

(a) 12 (b) 10 (c) 9 (d) 22

5/11

$45\frac{5}{11}\% = \frac{(11\times45)+5}{11}\% = \frac{495+5}{11}\% = \frac{500}{11\times100} = \frac{5}{11}$

$11x \times \frac{5}{11x} = 5x$

a → b : $-5x$

$11x \rightarrow 6x$ ← smaller

$11x \times \frac{5}{11x} = 5x$

$6x = 6\times2 = 12$

$(11x)^2 + (6x)^2 = 628$

$121x^2 + 36x^2 = 628$

$157x^2 = 628$

$x = 2$

Q5. In a class of 80 students and 5 teachers, each student got sweets that are 15% of the total number of students and each teacher got sweets that are 25% of the total number of students. How many sweets were there?

1 Min

(a) 1030
(b) 1040
(c) 1050
(d) 1060

Each Student got = 15% of 80 = $\frac{15}{100} \times 80 = 12$

Each teacher got = 25% of 80 = $\frac{1}{4} \times 80 = 20$

Total sweets = $12 \times 80 = 960$

$= 20 \times 5 = 100$

$960 + 100 = 1060$

Q6. When the price of a product decreased by 12%, the number of sales increased by 25%. What was the effect on total income?

1) 10%
2) 12%
3) 15%
4) 13%

	Initial		Final
Price	100 ₹	−12% →	88 ₹
Sale	× 100 pc	25% →	125 pc
Income	10000 ₹	⟶	11000 ₹

$$\% \text{ increase} = \frac{1000}{10000} \times 100 = 10\%$$

125
88
1000
1000
11000

Q7. The price of oil is increased by 25%. If the expenditure is not allowed to increase, the ratio between the reduction in consumption and the original consumption is

(a) 1 : 3 (b) 1 : 4 (c) 1 : 5 (d) 1 : 6

Price	100 ₹	+25% →	125 ₹
Quantity	100 lit	20 →	$x = \frac{10000}{125} = 80$ lit
Expenditure	10000		10000

$$\frac{\text{Reduction in consumption}}{\text{original consumption}} = \frac{20}{100} = \frac{1}{5}$$

Q8. The price of a commodity is decreased by 25 percent and therefore a household increased the consumption of that commodity by 20 kg to keep the expenditure same. What was the earlier consumption?

1) 60 kg
2) 55 kg
3) 75 kg
4) 45 kg

Price: 100 ₹ $\xrightarrow{-25\%}$ 75 ₹

Quantity: 60 = x kg (x + 20) kg

$$\frac{100x}{4x} = \frac{75(x+20)}{3}$$

$$4x = 3x + 60$$

$$x = 60 \text{ kg}$$

Q9. In an election between two candidates, one got 55% of total valid votes and 20% of the total votes casted were invalid. If total votes were 7500, then what is the number of valid votes that the other person got?

(a) 2550
(b) 2670
(c) 2700
(d) 2850

Casted votes $\Rightarrow 7500 \xrightarrow{20\%}$ $7500 \times \frac{20}{100} = 1500$

Valid votes

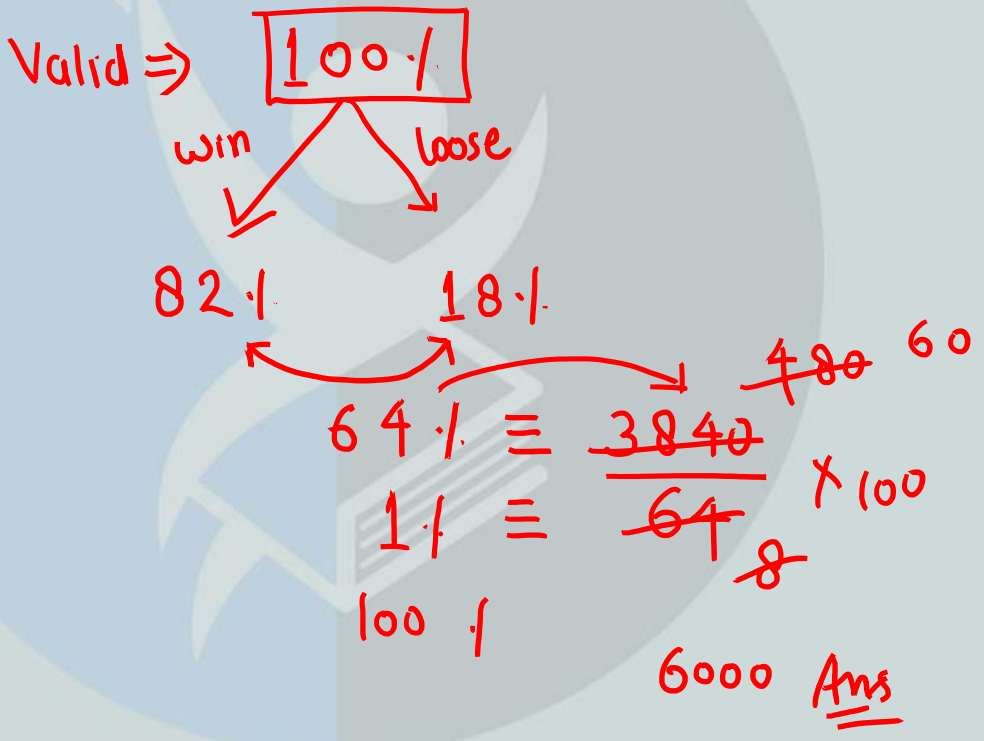
$7500 - 1500 = 6000$

55% 45%

$6000 \times \frac{45}{100} = 2700$ Ans

Q11. In an election between two candidates, the winner got 82% of total vote cast and won the election by a majority of 3840 votes. What is the total number of votes cast if no vote is declared invalid?

(A) 11000
(B) 4000
(C) 9000
(D) 6000



Q13. The entrance ticket of an exhibition was Rs 5. Later it was decreased by 20% and thus the sale amount is increased by 44%. What was the percentage increase in the number of visitors?

(a) 64%
(b) 24%
(c) 80%
(d) 20%

$5 \times \frac{1}{5} = 1$ ₹

Ticket: 5 ₹ → ↓20% (−1 ₹) → 4 ₹

Sale: 100 ₹ → 44% → 144 ₹

No. of visitors: $\frac{100}{5} = 20$ → 16 → $\frac{144}{4} = 36$

$\% = \frac{16}{20} \times \frac{5}{100} = 80\%$

Q14. Out of his total income, Amit spent 10% on travel expenses and 50% of rest on house hold expenses. If he saves Rs 4500 what is his total income?

(a) Rs 12,000
(b) Rs 10,000
(c) Rs 9000
(d) Rs 8000

Q15. Mr David spends 50% of his monthly income on household items and out of the remaining, he spends 50% on transport, 25% on entertainment, 10% on sports and remaining amount of Rs. 900 is saved. What is Mr David monthly income?

(a) Rs. 6000
(b) Rs. 12000
(c) Rs. 9000
(d) Cannot be determined

Q16. Mr. Amit gave 40% of the money he had, to his wife. He also gave 20% of the remaining amount to his three sons. Half of the amount now left was spent on other items and the remaining Rs. 12,000 was deposited in the bank. How much money did Mr. Amit have initially?

(a) Rs. 50,000
(b) Rs. 1,50,000
(c) Rs. 2,00,000
(d) Rs. 1,20,000

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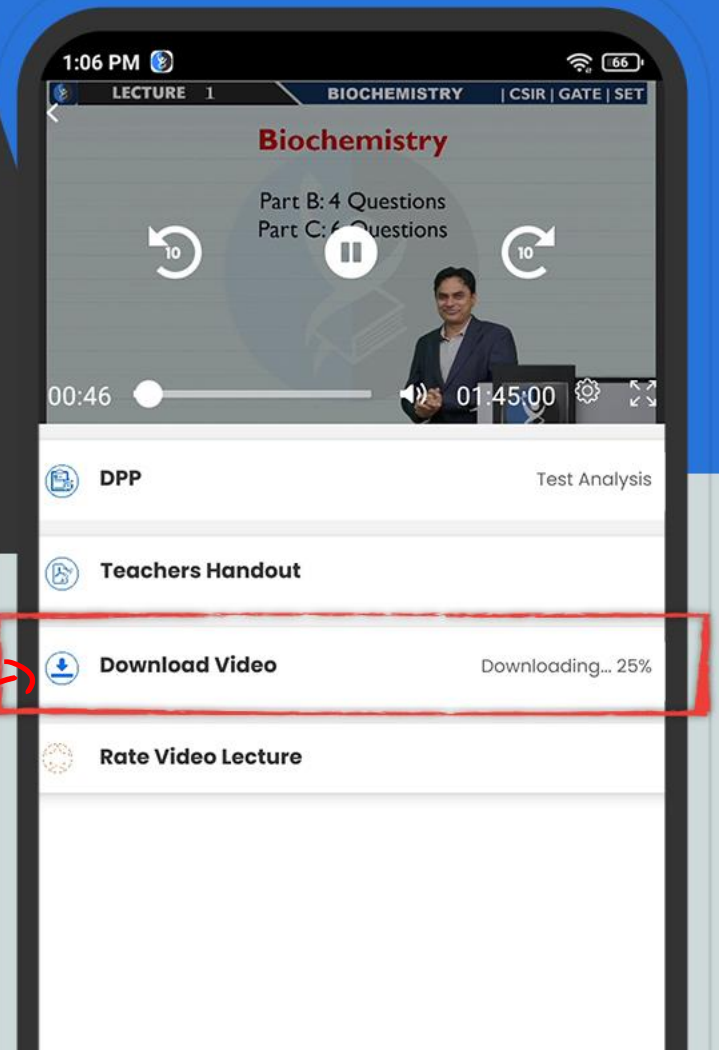

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